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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/805,216	03/14/2001	Shinya Kobayashi	HO4-3303/HO	8566
30743	7590	05/31/2005	EXAMINER	
WHITHAM, CURTIS & CHRISTOFFERSON, P.C. 11491 SUNSET HILLS ROAD SUITE 340 RESTON, VA 20190			NGUYEN, LAM S	
			ART UNIT	PAPER NUMBER
			2853	

DATE MAILED: 05/31/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

8m

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	09/805,216	KOBAYASHI ET AL.	
	Examiner	Art Unit	
	LAM S. NGUYEN	2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 March 2005.  
 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 2-8 and 10-15 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) ☒ Claim(s) 3-8, 10 and 11 is/are allowed.  
 6) ☒ Claim(s) 2 and 12-15 is/are rejected.  
 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
 10) ☒ The drawing(s) filed on 23 August 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) ☒ All b) ☐ Some \* c) ☐ None of:  
 1. ☒ Certified copies of the priority documents have been received.  
 2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
 \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 2, 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wen et al. (US 6046822) in view of Ikeda (US 6607260) and Tence et al. (US 5689291).

#### **Referring to claim 15:**

Wen et al. discloses an image forming device comprising:

a head formed with a plurality of nozzles (*FIG. 1a, element 45*);

a converting unit that converts recording data into driving data that defines driving pulses for corresponding ones of the plurality of nozzles (*column 1, line 66 to column 2, line 3 and FIG. 2-3, 5: The calibrator calibrates the input image file by converting the pixel values of the input image to waveform index number. As shown in FIG. 2, each waveform index number SN1-SNN represents characteristics of driving pulse for each nozzle TFIJ- TFNJ or TBIJ-TBNJ*);

an ejection element (*FIG. 1b, element 260*) provided to each one of the plurality of nozzles (*FIG. 1b, element 45*) for ejecting an ink droplet (*FIG. 1b, element 47*) from the corresponding nozzle onto the recording medium in response to the driving data; and

a memory that stores nozzle profile data including waveform data and timing data

Art Unit: 2853

for each of the plurality of nozzles, the waveform data and the timing data indicating a waveform and a generating timing, respectively, of the driving data for each one of the plurality of nozzles (*FIG. 2-3: a Look-Up-Table stores the waveform data  $A_1$ ,  $A_2$ ,  $W_1$ ,  $W_2$ , and timing data  $S_{1-2}$ ,  $S_{2-3}$  corresponding to the  $j$ th nozzle. Column 4, lines 8-15: The delay times before start of pulses  $TF_{ij}$  and  $TB_{ij}$  also account for manufacturing variabilities between ink nozzles, such as different nozzle diameters and orientation*), wherein

the converting unit converts the recording data into the driving data based on the nozzle profile data (*FIG. 1a-b: The controller 220 converts the recording data from ELECTRONIC MEMORY 20 into waveform data by associating nozzle data stored in LUT 60-63*), the driving data is a sequence of pulse data each corresponding to one of plurality of nozzles (*FIG. 2-4: The controller sequentially outputs waveform data to WAVEFORM GENERATOR 230 that generates a driving waveform to a nozzle selected by NOZZLE SELECTOR 240*) and each including a plurality of data sets (*FIG. 4: Each waveform data associating to an index waveform number includes at least 1<sup>st</sup> PULSE data and 2<sup>nd</sup> PULSE data*).

Wen et al. is silent about a feed unit that feeds a recording medium in a first direction and ink ejected onto the recording medium while the feed unit is feeding the recording medium in the first direction and does not disclose wherein the converting unit includes a measuring unit which determines a center position of an ink dot for each nozzle.

Ikeda discloses an ink jet printing apparatus having a feed unit (*FIG. 1, element 111-113*) that feeds a recording medium (*FIG. 1, element 111-114*) in a first direction (*FIG. 1: SUB-SCANNING DIRECTION*) and ink ejected onto the recording medium from a printhead (*FIG. 1, element 101*) while the feed unit is feeding the recording medium in the first direction and a

Art Unit: 2853

measuring unit which determines a center position of an ink dot for each nozzle (*FIG. 13-14*:

*The sensor that outputs voltages  $V1-V2$  indicating the distance between the centers of the dots 1-2).*

Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to modify the printing apparatus disclosed by Wen et al. to include the measuring unit as disclosed by Ikeda. The motivation for doing so would have been to automatically and accurately correct the recording position as taught by Ikeda (*column 2, lines 36-41*).

In addition, Wen et al. does not disclose that the converting unit includes a profile data update unit which adjusts an ink ejection amount of each nozzle and impact position Y of an ink droplet on recording medium for each nozzle.

Tence et al. discloses a printing apparatus having a unit that adjusts/modulates an ink ejection amount (*ink drop volume*) ejected from nozzles, thereby improving drop landing position accuracy (*column 2, lines 11-20*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to modify the printing apparatus disclosed by Wen et al. to include the unit that adjusts/modulates an ink ejection amount (*ink drop volume*) ejected from the nozzles as disclosed by Tence et al. The motivation for doing so would have been to achieve a higher drop ejection rate, a faster drop ejection velocity, and improved drop landing position accuracy as taught by Tence et al. (*column 2, lines 11-20*).

**Wen et al. also discloses the following claimed invention:**

**Referring to claim 2:** an updating unit that updates the waveform data for each of the

Art Unit: 2853

plurality of nozzles when a printing condition has been changed (*column 5, line 38-56: a corresponding updating unit adjusts landing times and associated time delays according to the replacement variability*).

**Referring to claim 12:** a leveling unit that levels generating timings of the driving pulses by changing the timing data of the nozzle profile data (*column 5, lines 38-51: a corresponding leveling unit that levels generating timings in termed of "landing times" and associated "time delays" according to the replacement variability; Column 2, line 11-15: control timing of the waveforms to compensate for physical variabilities between nozzles*).

**Referring to claim 13:** a resolution changing unit that changes a time resolution, wherein each one of the plurality of data sets of the driving data having an original time resolution, and the resolution setting unit that sets the original time resolution of each of the data sets to a predetermined time resolution and wherein the original time resolution determines the waveform of each of the driving pulses, and the predetermined time resolution determines the generating timing of each of the driving pulses (*column 5, lines 38-49: a corresponding resolution changing unit that changes a time resolution in termed of "landing times" and associated "time delays" according to the replacement variability*).

**Referring to claim 14:** wherein the original time resolution determines the waveform of each of the driving pulses and the predetermined time resolution determines the generating timing of each to driving pulses (*column 4, lines 13-24: Predetermined pulse width and time delays between pulses are selected according a desired mode*).

*Allowable Subject Matter*

Art Unit: 2853

2. Claims 3-8, 10-11 are allowed and the reasons for allowance were indicated in the previous office action.

***Response to Arguments***

Applicant's arguments with respect to claim 15 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAM S NGUYEN whose telephone number is (571)272-2151. The examiner can normally be reached on 7:00AM - 3:30PM.


Art Unit: 2853

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, STEPHEN D MEIER can be reached on (571)272-2149. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LN

May 24, 2005



HAI PHAM  
PRIMARY EXAMINER